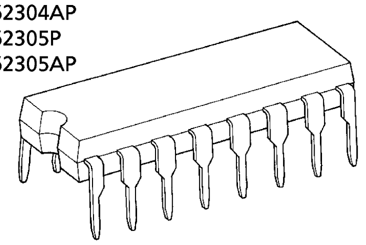
TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62304P, TD62304AP, TD62304F, TD62304AF
TD62305P, TD62305AP, TD62305F, TD62305AF

7CH LOW ACTIVE DARLINGTON SINK DRIVER

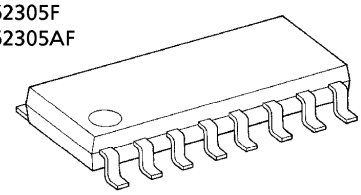
The TD62304P / AP / F / AF and TD62305P / AP / F / AF are non-inverting transistor arrays, which are comprised of eight NPN darlington output stages and PNP input stages.
These devices are Low Level input active drivers and are suitable for operations with TTL, 5V CMOS and 5V Microprocessor which have sink current output drivers.
Applications include relay, hammer, lamp and LED driver.

TD62304P
TD62304AP
TD62305P
TD62305AP



DIP16-P-300-2.54A

TD62304F
TD62304AF
TD62305F
TD62305AF



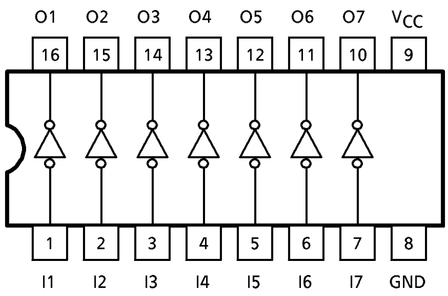
SOP16-P-225-1.27

Weight
DIP16-P-300-2.54A : 1.11g (Typ.)
SOP16-P-225-1.27 : 0.16g (Typ.)

FEATURES

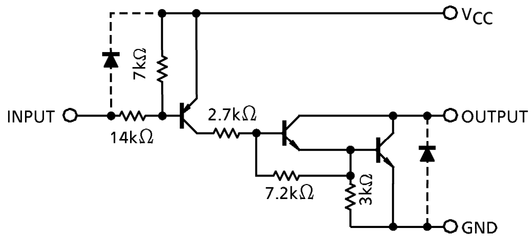
- Output current (single output) 500mA (Max.)
- High sustaining voltage 35V (TD62304P / F, 62305P / F)
  50V (TD62304AP / AF, 62305AP / AF) (Min.)
- Low level active input
- Standard supply voltage
- Input compatible with TTL and 5V CMOS

PIN CONNECTION (TOP VIEW)

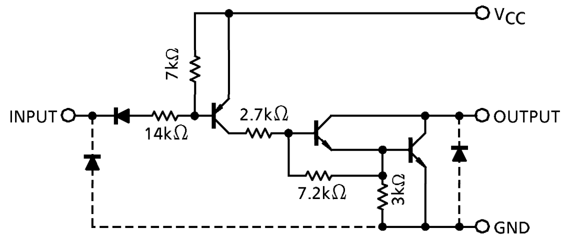


SCHEMATICS (EACH DRIVER)

TD62304P / AP / F / AF



TD62305P / AP / F / AF



(Note) The input and output parasitic diodes cannot be used as clamp diodes.

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V_{CC}	− 0.5~7.0	V
Output Sustaining Voltage	P, F	$V_{CE\ (SUS)}$	− 0.5~35	V
	AF		− 0.5~50	
	AP		− 0.5~50	
Output Current		I_{OUT}	500	mA / ch
Input Voltage		V_{IN}	− 22~V_{CC} + 0.5	V
			− 0.5~7 (Note 1)	
Input Current		I_{IN}	− 10	mA
Power Dissipation	P	P_D	1.0	W
	AP		1.47	
	F, AF		0.625 (Note 2)	
Operating Temperature	P	T_{opr}	− 30~75	°C
			− 40~85	
Storage Temperature		T_{stg}	− 50~150	°C

(Note 1) TD62305P / AP / F / AF
(Note 2) On glass epoxy PCB (30 × 30 × 1.6mm Cu 50%)

RECOMMENDED OPERATING CONDITIONS (Ta = −40~85°C and Ta = −30~75°C for Type-P)

CHARACTERISTIC		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage		V_{CC}	—	4.5	5.0	5.5	V
Output Sustaining Voltage	P, F	$V_{CE\ (SUS)}$	—	0	—	35	V
	AF			0	—	50	
	AP			0	—	50	
Output Current		I_{OUT}	DC 1 circuit	0	—	350	mA / ch
	P		T_{pw} = 25ms, duty = 10% 7 circuits	0	—	300	
	AP		T_{pw} = 25ms, duty = 10% 7 circuits	0	—	350	
			T_{pw} = 25ms, duty = 20% 7 circuits	0	—	200	
Input Voltage	TD62304P / AP / F / AF	V_{IN}	—	−20	—	V_{CC}	V
	TD62305P / AP / F / AF			0	—	5.5	
Power Dissipation	P	P_D	—	—	—	0.44	W
	AP		—	—	—	0.52	
	F, AF		(Note 1)	—	—	0.325	

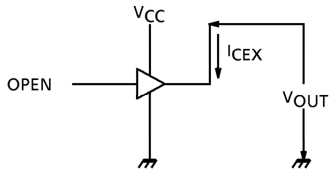
(Note 1) On glass epoxy PCB (30 × 30 × 1.6mm Cu 50%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

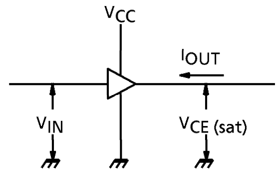
CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Leakage Current	P / F	I_{CEX}	1	V_{CC} = 5.5V V_{IN} = 0V	V_{OUT} = 35V, Ta = 75°C	—	—	−100	μA
					V_{OUT} = 50V, Ta = 85°C				
Output Saturation Voltage		$V_{CE\ (sat)}$	2	V_{CC} = 4.5V I_{OUT} = 350mA	V_{IN} = $V_{IN\ (ON)}$ MAX.	—	1.4	2.0	V
Input Current	(Output On)	$I_{IN\ (ON)}$	3	V_{CC} = 5.5V, V_{IN} = 0.4V		—	−0.32	−0.45	mA
				V_{CC} = 5.5V, V_{IN} = −20V		—	—	−2.6	
	(Output Off)	$I_{IN\ (OFF)}$	4	—		—	—	−40	μA
Input Voltage (Output On)	TD62304	$V_{IN\ (ON)}$	5	—		—	—	V_{CC} −2.8	V
	TD62305					—	—	V_{CC} −3.7	
Supply Current	(Output On)	$I_{CC\ (ON)}$	6	V_{CC} = 5.5V, V_{IN} = 0V		—	17	22	mA
	(Output Off)	$I_{CC\ (OFF)}$	6	V_{CC} = V_{IN} = 5.5V		—	—	100	μA
Turn-On Delay	P, F	t_{ON}	7	V_{CC} = 5V C_L = 15pF	V_{OUT} = 35V, R_L = 87.5Ω	—	0.1	—	μs
	AP, AF				V_{OUT} = 50V, R_L = 125Ω				
Turn-Off Delay	P, F	t_{OFF}			V_{OUT} = 35V, R_L = 87.5Ω	—	3	—	
	AP, AF				V_{OUT} = 50V, R_L = 125Ω				

TEST CIRCUIT

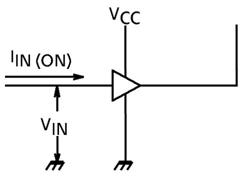
1. I_{CEX}



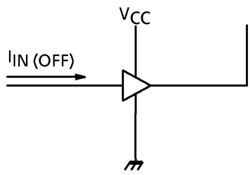
2. $V_{CE\ (sat)}$



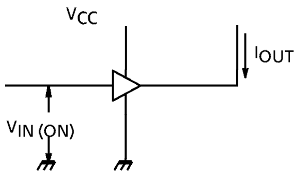
3. $I_{IN\ (ON)}$



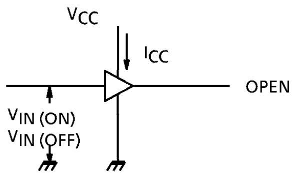
4. $I_{IN\ (OFF)}$



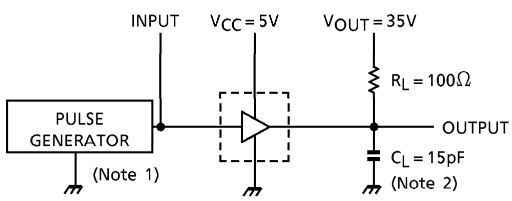
5. $V_{IN\ (ON)}$

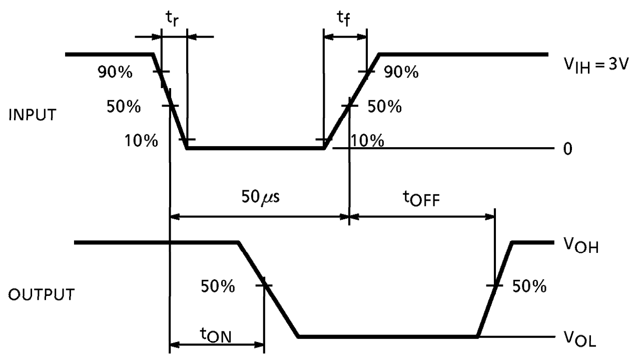


6. I_{CC}



7. t_{ON}, t_{OFF}



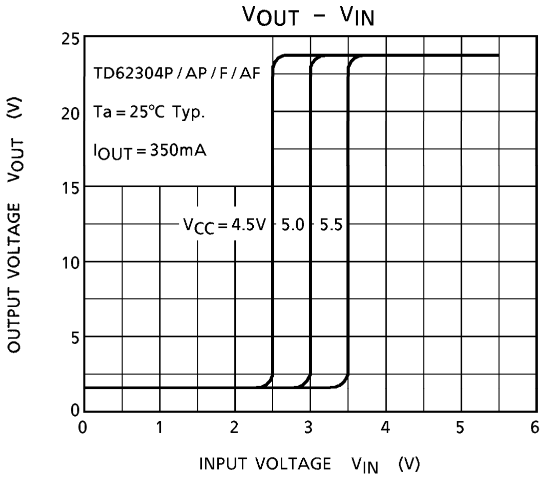


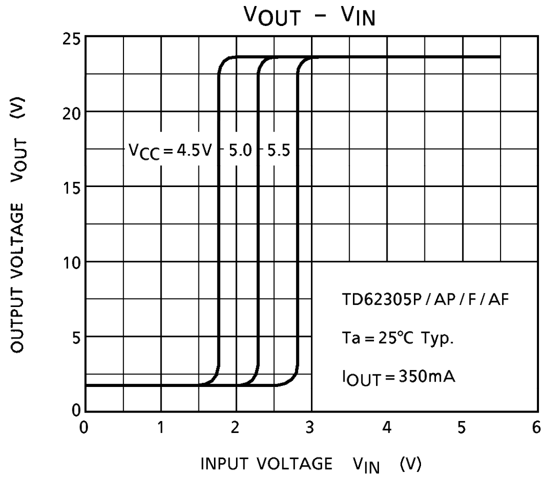
(Note 1) Pulse width 50μs, duty cycle 10%
Output impedance 50Ω, $t_r \leqq$ 10ns, $t_f \leqq$ 5ns

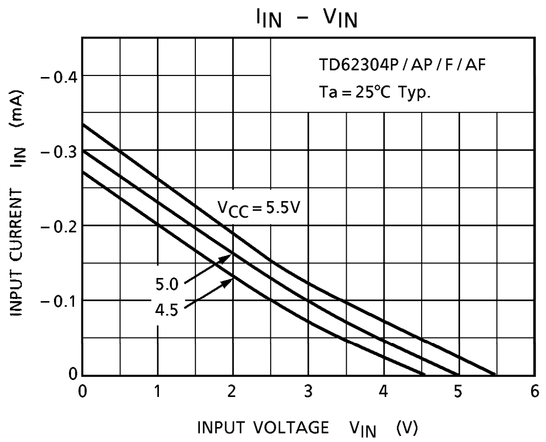
(Note 2) C_L includes probe and jig capacitance.

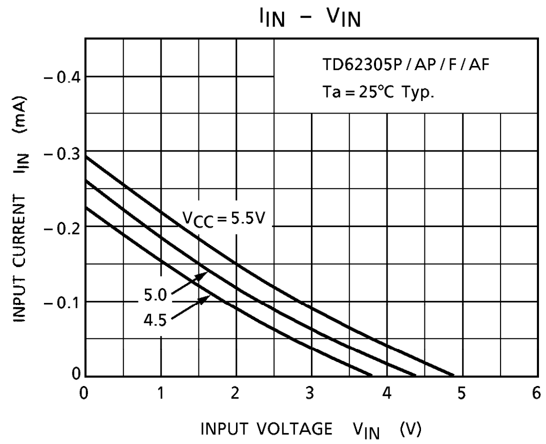
PRECAUTIONS FOR USING

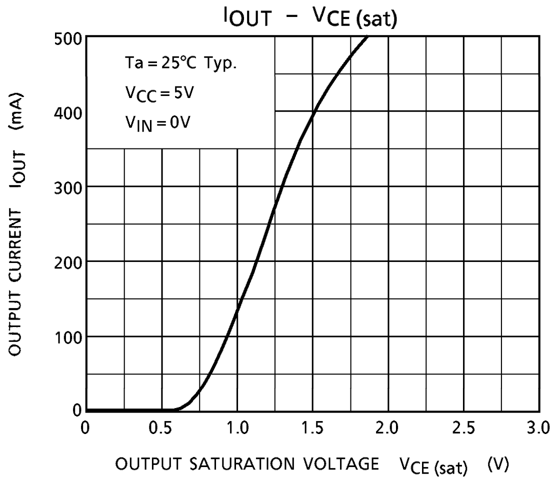
Utmost care is necessary in the design of the output line, V_{CC} and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.

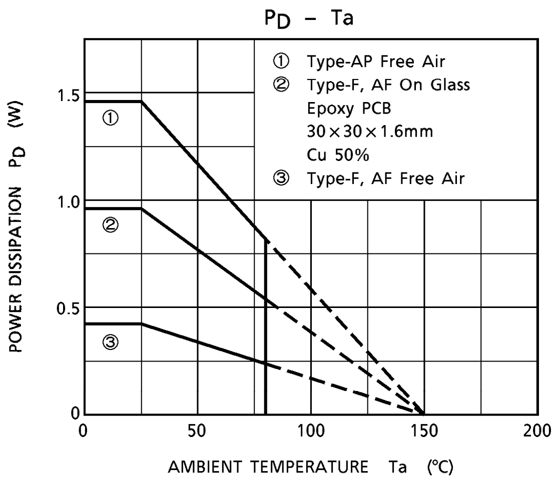

VOUT – VIN
TD62304P / AP / F / AF
Ta = 25°C Typ.
IOUT = 350mA
VCC = 4.5V 5.0 5.5
OUTPUT VOLTAGE VOUT (V)
INPUT VOLTAGE VIN (V)

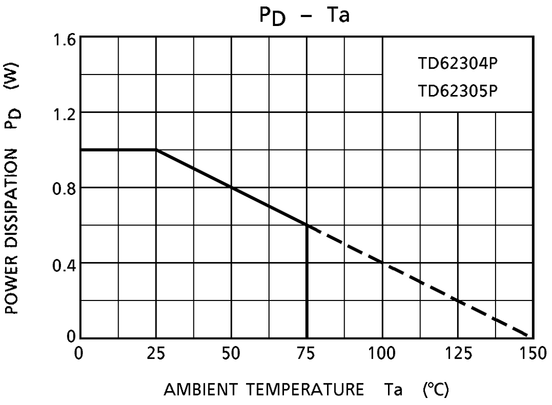

VOUT – VIN
VCC = 4.5V 5.0 5.5
TD62305P / AP / F / AF
Ta = 25°C Typ.
IOUT = 350mA
OUTPUT VOLTAGE VOUT (V)
INPUT VOLTAGE VIN (V)


IIN – VIN
TD62304P / AP / F / AF
Ta = 25°C Typ.
VCC = 5.5V
5.0
4.5
INPUT CURRENT IIN (mA)
INPUT VOLTAGE VIN (V)


IIN – VIN
TD62305P / AP / F / AF
Ta = 25°C Typ.
VCC = 5.5V
5.0
4.5
INPUT CURRENT IIN (mA)
INPUT VOLTAGE VIN (V)


IOUT – VCE (sat)
Ta = 25°C Typ.
VCC = 5V
VIN = 0V
OUTPUT CURRENT IOUT (mA)
OUTPUT SATURATION VOLTAGE VCE (sat) (V)


PD – Ta
① Type-AP Free Air
② Type-F, AF On Glass Epoxy PCB 30 × 30 × 1.6mm Cu 50%
③ Type-F, AF Free Air
POWER DISSIPATION PD (W)
AMBIENT TEMPERATURE Ta (°C)

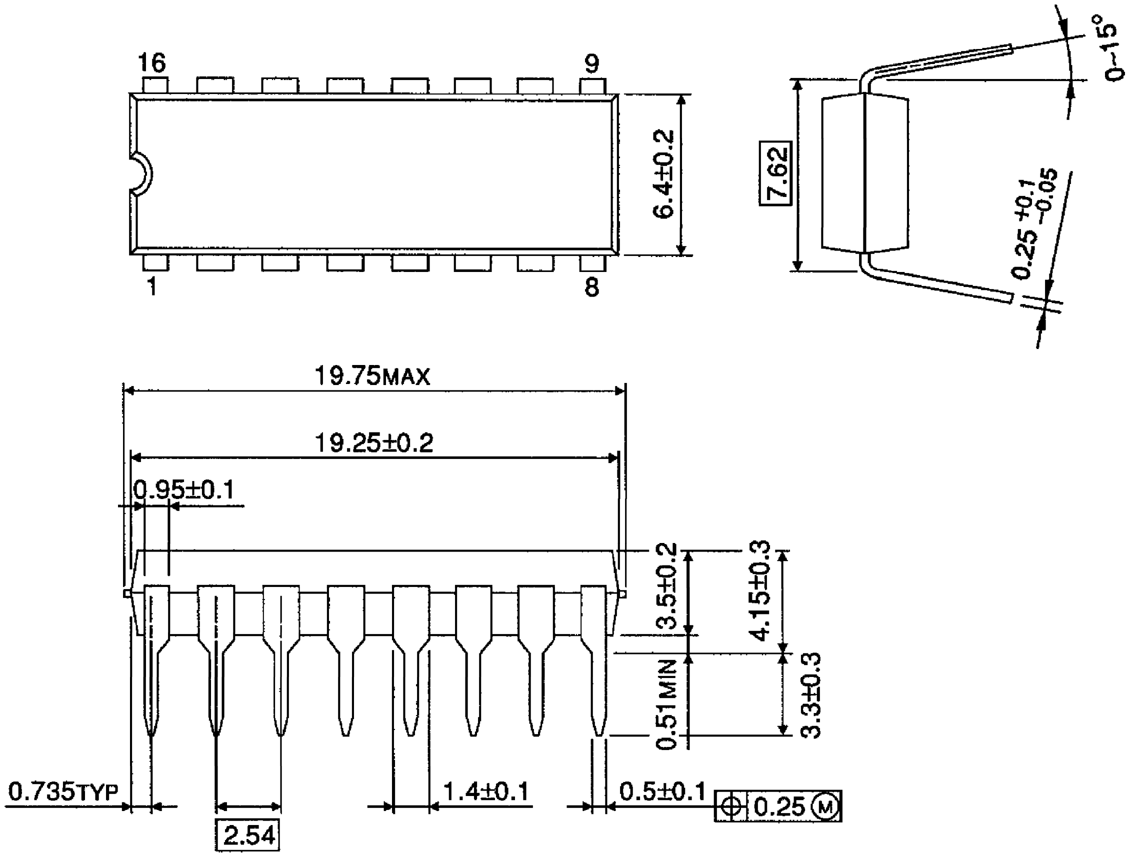


P_D – Ta
TD62304P
TD62305P
POWER DISSIPATION P_D (W)
AMBIENT TEMPERATURE Ta (°C)
1.6
1.2
0.8
0.4
0
0
25
50
75
100
125
150

OUTLINE DRAWING

DIP16-P-300-2.54A

Unit : mm

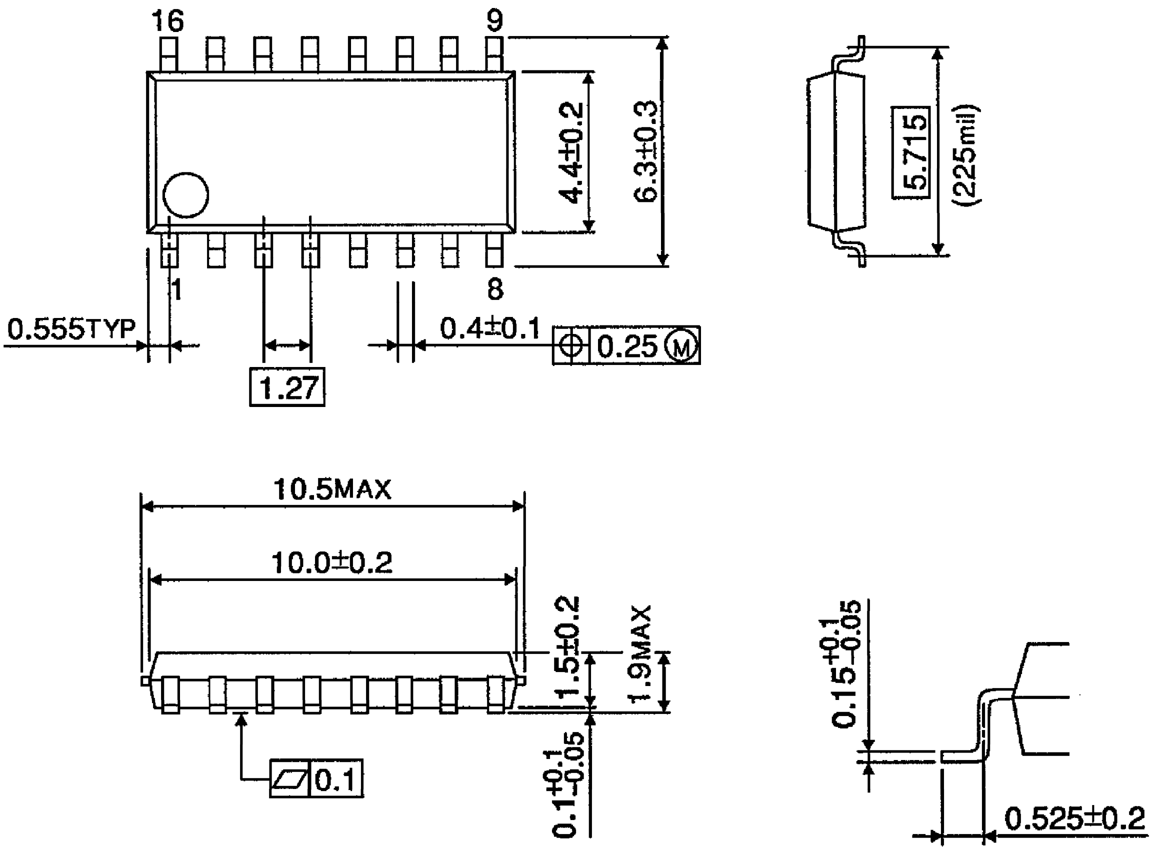


Weight : 1.11g (Typ.)

OUTLINE DRAWING

SOP16-P-225-1.27

Unit : mm



Weight : 0.16g (Typ.)